

and typewriters for example, and known in the art is employed. In another embodiment a lint-free cotton material such as TX 309 TEXWIPE or the equivalent is used. TEXWIPE is a trademark used by Texwipe Incorporated of Upper Saddle River, New Jersey. A padded pressure plate 270, vertically actuated by means of a cam 280 for example, can be used to bring the fabric tape into contact with the orifice plate. Again the tape could be contained in a replaceable cassette 276 having a tape access window 278.

With reference to FIG. 35 in another embodiment a continuous loop of a lint-free fabric tape 268 such as described above is used to apply treatment fluid to the orifice plate 40 of a printhead 30, and again performs a cleaning function in addition to transferring treatment fluid to the printhead. In this embodiment the fabric loop is disposed on rollers 281 supported by the service station 50 and driven by a transfer wheel roller 222 turned by a shaft 282 coupled to a drive motor (not shown) controlled by the printer controller. The transfer wheel is in a treatment fluid bath 284, comprising for example a high molecular weight PEG which is heated for use, but otherwise is in solid form preventing leakage from tipping etc. As will be apparent, the transfer wheel could alternatively be wetted as described above in connection with FIGS. 23, 24, 25, or 31 for example. Returning to FIG. 35 a padded pressure plate 270 is vertically movable by a hydraulic actuator 286 to bring the fabric tape into and out of contact with the orifice plate. To accommodate vertical deflection of the fabric tape, and maintain a constant tension on the fabric tape, a spring-biased tensioner 288 is conventionally provided.

Turning now to FIGS. 36-39, in a further embodiment of the invention a metered amount of treatment fluid 74 is applied directly to the printhead 30 by throwing or projecting it through the air from a projecting means onto the orifice plate 40. An advantage of such a system is that the source of treatment fluid is not contaminated by contact with a wiper 70 or the printhead.

Referring to FIG. 36, in one embodiment a low-volume mechanical spray pump 290 carried by the service station 50 is actuated, for example by a cam or solenoid (not shown), to spray a metered dose of one to five microliters of treatment fluid onto the orifice plate as it passes by or is stationed over a sprayhead 292 of the pump. Treatment fluid is stored in a collapsible fluid reservoir 220 fluidly connected to the pump via a fluid conduit 152 in this embodiment. The treatment fluid is PEG of molecular weight 200-600 in this embodiment.

With reference to FIG. 37, in another embodiment the treatment fluid 74 is thrown or projected onto the printhead by a thermal jetting process in the same way as ink is projected in well-understood thermal inkjet processes used in printing. An inkjet-like cartridge 294 having a collapsible treatment fluid reservoir 296 and a conventional thermal printhead 298 connected to a power supply 300 is positioned, for example on a service station sled 52, so as to be able to project treatment fluid onto the pen printhead as desired, the jetting of treatment fluid being controlled by the printer controller 94 and coordinated with the motion of the printhead 30 passing by or stationed over the treatment fluid-projecting printhead 298. The cartridge is filled with a jettable treatment fluid, for example one-half PEG of between 200 and 600 molecular weight, and one-half water. As can be appreciated, a piezo-electric ink jetting cartridge, also otherwise conventional, can be used instead of a thermal system. An advantage of this embodiment is that treatment fluid can be metered, for example by counting drops ejected as is known in the art to provide an optimal dose of treatment fluid.

Turning to FIGS. 38 and 39 in another embodiment of the invention the treatment fluid 74 is thrown or projected

toward the printhead 30 by a spring steel "flipper" 302 cantilever-mounted on the service station 50 adjacent a tumbler 162 having a relatively stiff transfer wiper 304 mounted thereon. A treatment fluid source 184, for example comprising a mesh-covered foam reservoir 100 as described above, is positioned to be contacted by the transfer wiper as the tumbler is rotated. Other reservoir embodiments described herein could be substituted for the mesh-covered foam reservoir shown. As the tumbler 162 is rotated a small reproducible quantity of treatment fluid is picked up by the transfer wiper 304 as it wipes the mesh-covered foam treatment fluid reservoir 100. This quantity of treatment fluid is transferred to the spring steel flipper 302 as the transfer wiper rotates around and contacts the flipper. The flipper is elastically deflected downwardly, and scrapes the tumbler mounted transfer wiper clean of treatment fluid as the transfer wiper continues to rotate past. As can be appreciated, when the transfer wiper clears the flipper the flipper is released and rebounds upwardly, flinging a reproducible portion of the treatment fluid upward and onto a printhead 30 to be serviced, the printhead being positioned at a first position above the flipper for this purpose.

After the treatment fluid 74 has been thrown onto the printhead 30 the printhead is moved along its axis of travel to a second position to be wiped by an offset tumbler-mounted wiper 70. This is best appreciated with reference to FIG. 39.

With reference to FIG. 40, in another embodiment the spray pump, treatment fluid jet, or flipper described above can be used to apply treatment fluid to the wiper instead of the printhead directly. As an example, a service station-mounted PEG-jetting cartridge 294 as described above and controlled by the printer controller 94 is configured to spray treatment fluid onto a wiper 70 prior to wiping the orifice plate 40. The advantages with regard to metering treatment fluid amounts, and preservation of the cleanliness of the source of treatment fluid are obtained in this embodiment as well. As can be appreciated a separate service station-mounted scraper 170 as described above can be provided.

With reference to all the embodiments described herein the application of a treatment fluid in the printhead wiping process adds one more parameter (the treatment fluid itself) that can be varied to keep the printhead 30 clean, resulting in better print quality over the life of the printer 10, and lower operating costs and reduction of wasted resources due to improper printhead function attributable to inadequate cleaning, particularly where pigment-based, quick drying and waterfast inks are employed. By matching the chemical and physical characteristics of the ink, orifice plate surface 40 and wiper 70 with a complementary treatment fluid, optimization of pen cleanliness, wiper life and servicing speed is possible. These considerations are especially important if a given printhead is used for a long period of time. Moreover, the results of the invention can be obtained using configurations that are maintenance-free throughout the life of the printer 10. These considerations result in overall improved performance at low additional cost to purchasers.

Persons skilled in the art will readily appreciate that various modifications can be made from the presently preferred embodiments of the invention disclosed herein and that the scope of protection is intended to be defined only by the limitations of the appended claims.

We claim:

1. A method of servicing an inkjet printer printhead comprising the steps of:

providing a wiper mounted for movement with respect to the inkjet printer printhead in wiping contact therewith to remove unwanted accumulation from the printhead; providing a source of printhead servicing fluid;

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control means for counting drops of servicing fluid propelled from said applicator to help facilitate controlling the amount of servicing fluid applied to the inkjet printer printhead based on the counted number of drops.

7. The system of claim 6, further comprising a counter coupled to said applicator head for counting drops of servicing fluid ejected therefrom to control the amount of servicing fluid applied to the printhead.

20 9. The system of claim 8, further comprising a transfer wiper for placing servicing fluid from said source onto said spring by wiping contact, said transfer wiper being positioned to elastically bend said spring away from said at least one printhead and wiper element and then release said
25 spring.

30 said applicator head being in fluid communication with
said cartridge for jetting a desired volume of said
treatment fluid onto said printhead orifice plate to
facilitate an improved wiping action.

40 14. A method of servicing a portion of a printhead of an inkjet printer comprising the steps of:

vaporizing said servicing fluid to jet ejectingly said fluid from said applicator printhead; and
said servicing fluid being projected from said applicator printhead onto the printhead and said wiper.

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